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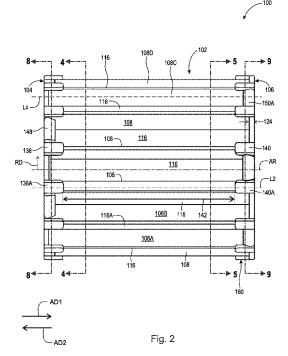
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(54) Title: RIBBON CAGE AND ROLLER ASSEMBLY AND METHOD THEREOF



(57) Abstract: A roller bearing cage, including: an axis of rotation; a body including a plurality of bars, each bar having a length, in a first axial direction parallel to the axis of rotation, a height, in a radial direction orthogonal to the axis of rotation, less than the length and a width, in a circumferential direction, less than the height; and a plurality of spaces, each space circumferentially disposed between a respective pair of circumferentially adjacent bars and arranged to receive a respective roller.

EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

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A. CLASSIFICATION OF SUBJECT MATTER

F16C 33/46(2006.01)i, F16C 19/26(2006.01)i, B21D 53/12(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols) F16C 33/46; F16C 33/41; F16C 33/50; F16C 33/56; F16C 33/51; F16C 33/38; B21D 53/12; F16C 19/26

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) eKOMPASS(KIPO internal) & Keywords: bearing, cage, retainer, bar, end panel, plate, space, roller

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002-0081049 A1 (BUARD et al.) 27 June 2002 See paragraphs [0032]-[0041]; claim 1; and figures 1, 5-7.	1-4,11-12,14
A	see paragraphs [0002] [0041], Craim 1, and figures 1, 57.	5-10,13,15-20
A	WO 2015-091725 A1 (AKTIEBOLAGET SKF) 25 June 2015 See page 9, lines 1-9; and figure 1B.	1-20
A	US 6179474 B1 (PODHAJECKI, STEPHEN T.) 30 January 2001 See claims 1-4; and figures 1-2.	1-20
A	US 2012-0063713 A1 (BEUERLEIN, WERNER) 15 March 2012 See paragraphs [0050]-[0055]; and figures 1-2.	1-20
A	KR 10-2014-0076854 A (JEIL BEARING CO., LTD.) 23 June 2014 See paragraphs [0020]-[0028]; and figures 1, 2a-2f, 5.	1-20



See patent family annex.

- * Special categories of cited documents:
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- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed
- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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- "&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2002-0081049 A1	27/06/2002	AT 338218 T DE 60122660 T2 EP 1219842 A1 EP 1219842 B1 FR 2818709 A1 FR 2818709 B1 US 6837624 B2	15/09/2006 13/09/2007 03/07/2002 30/08/2006 28/06/2002 04/04/2003 04/01/2005
WO 2015-091725 A1	25/06/2015	CN 105899826 A EP 3084239 A1 GB 2521395 A US 2017-0023061 A1	24/08/2016 26/10/2016 24/06/2015 26/01/2017
US 6179474 B1	30/01/2001	DE 19853686 A1	27/05/1999
US 2012-0063713 A1	15/03/2012	CN 102356247 A CN 102356247 B DE 102009012241 A1 DK 2414691 T3 EP 2414691 A2 EP 2414691 B1 JP 2012-519805 A JP 5672245 B2 WO 2010-102603 A2 WO 2010-102603 A3	15/02/2012 24/05/2017 09/09/2010 12/09/2016 08/02/2012 01/06/2016 30/08/2012 18/02/2015 16/09/2010 11/11/2010
KR 10-2014-0076854 A	23/06/2014	KR 10-1503574 B1	18/03/2015